

ANALISIS PENGARUH PERUBAHAN BEBAN TERHADAP KARAKTERISTIK GENERATOR SINKRON SATU FASA

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INTISARI

Generator sinkron merupakan alat listrik yang berfungsi mengkonversikan energi mekanis berupa putaran menjadi energi listrik. Energi mekanis berupa putaran tersebut dihasilkan oleh penggerak mula (*prime mover*). Generator sinkron harus dioperasikan dengan putaran yang stabil agar mendapatkan output generator berupa tegangan dan frekuensi yang stabil.

Kestabilan kinerja generator sinkron dipengaruhi oleh arus eksitasi (I_f), kecepatan putar (n) generator, besar beban dan faktor daya beban ($\cos\phi$). Adanya perubahan besar beban dan jenis beban yang ditopang generator akan mengakibatkan ketidakstabilan kinerja generator. Dalam penelitian ini dilakukan percobaan dan analisis perubahan beban terhadap karakteristik generator sinkron satu fasa untuk mengetahui pengaruh antara besarnya perubahan beban resistif (R), resistif-induktif (R-L) dan resistif-kapasitif (R-C) terhadap tegangan keluaran generator (V_t), arus medan magnet generator/eksitasi (I_f) dan arus beban generator (I_a) sehingga kestabilan kinerja generator dan keseimbangan dalam sistem generator sinkron satu fasa dapat dicapai.

Kata Kunci : Generator Sinkron, Penggerak Mula, Tegangan Terminal (V_t), Arus Eksitasi (I_f), Frekuensi (f), Kecepatan Putar (n), Faktor Daya ($\cos\phi$), Kestabilan Kerja Generator.

**LOAD CHANGES EFFECT ANALYSIS ON THE CHARACTERISTIC
OF A SINGLE-PHASE AC SYNCHRONOUS GENERATOR**

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ABSTRACT

Synchronous generator is an electrical tool that have functions to convert mechanical energy in the form of rotation into electrical energy. The mechanical energy of the rotation is generated by prime movers. The synchronous generator must be operated with a stable spin to get stable voltage and frequency from the generator.

The performance stability of synchronous generator are affected by excitation current (I_f), spinning speed (n), load size and load power factor ($\cos \phi$). The load changes and load types which relies on the generator will cause instability of the generator performance. In this experiment, we analyze the load changes effect on the characteristic of a single-phase synchronous generator to know the effect between resistive (R), resistive-inductive ($R-L$) and resistive-capacitive (RC) load to generator terminal voltage or output voltage (V_t), excitation current (I_f) and load current (I_a) so that the stability of generator performance and balance in a single phase synchronous generator system can be achieved.

Key Words : *Synchronous Generator, Prime Mover, Terminal Voltage (V_t), Excitation Current (I_f), Frequency (f), Spinning Speed (n), Power Factor ($\cos \phi$), Stability of Generator Performance.*